Dryden Flight Research Center
P. O. Box 273
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DCP-S-028
Revision: Baseline

# DRYDEN CENTERWIDE PROCEDURE

## CODE SH

# Critical Lift

Electronically Approved by:
Associate Director

Concurred by:
Director, Safety and Mission Assurance

Concurred by:
Chief, Safety, Health, and Environmental Office

DOCUMENT HISTORY LOG

| Status | Document Revision | Date Approved | Description |
|---|---|---|---|
| Baseline | | See IDMS Document Master List | |
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# 1.0 INTRODUCTION

## 1.1 Purpose

This DCP provides procedures, documentation, and training and certifications requirements to ensure safe Critical Lift operations when NASA owned or controlled high value or mission critical objects are hoisted or lifted.

## 1.2 Applicability

This DCP applies to government and non-government personnel at DFRC and DFRC controlled off-site operations when engaged in hoisting or lifting NASA high value or mission critical objects.

## 1.3 Scope

This document defines responsibilities and establishes procedures to ensure control and protection of personnel and equipment when NASA high value or mission critical objects are lifted.

# 2.0 APPLICABLE DOCUMENTS

## 2.1 Authority Documents

29 CFR 1910.180; Crawler locomotive & Truck cranes.
29 CFR 1910.179; Overhead and Gantry Cranes.
29 CFR 1910.184; Slings.
29 CFR 1926.554; Overhead Hoists.
29 CFR 1926.550; Cranes and Derricks
Dryden Centerwide Procedure (DCP) -S-033. Cranes, Hoists, and Slings.
NSS/GO 1740.9B or NASA-STD-8719.9 (when published).

## 2.2 Guideline Documents

ASME/ANSI; B30.2; Overhead and Gantry Cranes
ASME/ANSI; B30.5; Mobile & Locomotive Cranes
ASME/ANSI, B30.9; Slings
ASME/ANSI, B30.10; Hooks
ASME/ANSI, B30.16; Overhead Hoist
ASME/ANSI, B30.20; Below-the-Hook Lifting Device

## 3.0 DEFINITION

Critical Lifts: Critical lift includes the lifting of personnel, high dollar value articles, spacecraft hardware, one-of-a-kind articles, or major components whose loss would:

- Cause significant work delay.
- Cause undetectable damage resulting in future operational or safety problems.
- Result in the release of a hazardous material or other undesirable condition.
- Present a potentially unacceptable risk of personnel injury or property damage.

## 4.0 ROLES and RESPONSIBILITIES

### 4.1 Overview

The chain of responsibility for ensuring that there is a safe work environment at DFRC that follows required safety standards, regulations, codes, and guidelines starts with the Center Director and flows downward through management to supervisors. In addition, each person who works at DFRC must understand that a "condition of employment" is to observe all safety specifications applicable to the task being performed.

### 4.2 Project Managers

Project Managers who are required to make a Critical Lift will ensure that procedures and precautions listed in this document as well as those basic requirements of non-critical lifts are followed.

### 4.3 Critical Lift Supervisor

A supervisor will be assigned Critical Lift Supervisor for each lift. Responsibilities include:

- Reading and understanding the pre-lift plan.
- Ensuring each employee is trained for his or her position and that all employees understand the safety procedures to be followed.
- Determining that required inspection have been completed on the lifting device.

- Ensuring that lift area is secure, all traffic is re-routed, and unauthorized persons are not allowed to enter area during lift.

## 5.0 CRITICAL LIFT PROCEDURES

### 5.1 Critical and Non-Critical Lifts

Hoisting operations conducted at DFRC are of two categories, critical and non-critical. Critical lifts include lifting within 75% of the rated capacity of the crane, lifting personnel, special high-dollar items such as one-of-a-kind objects, spacecraft, and other items whose loss would have serious programmatic impact. Non-critical lifts involve minimal hazard lifting operations, which are governed by standard industry rules and practices.

The Office of Primary Responsibility (OPR) for critical lifts is Code SH "Industrial Safety Office," except for Facility lifts (see section 5.2).

### 5.2 Facility Critical Lifts

Facility lift consists of the lifting of any part of a structure, support equipment, antennas, HVAC, etc.

- Facility lifts will utilize DCP-F-500, "Responsibility for Construction Safety", and EM 385-1-1, US Army Corps of Engineer's Standard.

- The Safety, Health, and Environmental Office will have safety oversight of the critical lift program.

- The OPR for a Facility lift is Code F "Research Facilities"

### 5.3 Planning

The person requiring the lift, such as the Project Manager or Operations Engineer, will plan a meeting a minimum of three days prior to the lift, with Safety Representatives, to discuss what the lift entails.
Safety Representatives are:

- Industrial Safety Office
- Quality Assurance

This meeting will be to discuss what special critical lift requirements are needed, and that the following required items are completed.

- A critical lift procedure is completed for the specific lift operation (even if other than Dryden personnel are performing the lift) and signed off by the safety representatives and responsible parties (i.e., Project Manager/Operations Engineer, etc). DFRC 230, "Critical Lift Process Approval" will be used to validate this process. See Appendix A.

- A detailed hazard analysis report, submitted by the Project Manager/Operations Engineer, is also required for critical lift operations.

5.4 Certification/Verification Requirements

If Dryden personnel and equipment are utilized the following items must be assured:

- Current operator training certificate.
- Sling rating verification.
- Sling inspection verification.
- Crane inspection verification.

If an off-site crane contractor accomplishes the critical lift the contractor will provide the Contracting Officer with:

- Current operators training certificate.
- Sling rating certificate/verification.
- Sling inspection certificate/verification.
- Crane annual inspection report.

5.5 Prior to the Day of Lift

Prior to the day of lift, a meeting with the Safety Representatives will be scheduled by the party requiring the lift or his/her representative to review the specific lift plan, the hazard analysis, and if needed, to review copies of operator's certificates. Once these items have been approved the appropriate individuals will sign DFRC 230.

If multiple lifts are planned in a short period of time (ie, five days) of the initial configuration, they will be planned for during this meeting and be noted in the lift procedure.

5.6 Day of Lift

A pre-lift safety meeting will be conducted with all involved individuals to discuss the following issues:

- The lift plan will be followed as approved.
- Each lift team member's responsibilities.
- Lift items must have tag lines at both ends for controllability.
- Hard hats and steel-toed boots are mandatory for all individuals.
- No unauthorized personnel will enter the area.
- For preplanned multiple lifts, a safety meeting will be performed prior to every lift.
- No personnel under vehicle while suspended by crane

Safety Representatives will be present during the critical lift operation to monitor the operation for compliance with this DCP.

Upon completion of the lift, a debriefing will be held to discuss any problems and lessons learned. Adverse lessons learned will be reported to Code S (if any).

6.0 TRAINING

There are two levels for operator certification, non-critical and critical lifts. Non-critical lift training is performed yearly following standard NASA/OSHA requirements. Operators that are being certified to perform critical lifts will have added training in the specific hazards and special procedures associated with these lifts. Critical lift operators will have both certifications prior to performing any critical lift operation. These individuals will be named by their supervisors as having a need to be critical lift certified. They will be tracked by the training database and have their operator's qualification card annotated as "critical lift" qualified. Operators will demonstrate proficiency and operating finesse with mobile or overhead cranes.

For detailed instructions of critical lifts and inspection requirements, the use of NSS/GO-1740.9B, soon to be updated to NASA-STD-8719.9. This NSS/GO is located in the Safety Office and NASA-STD-8719.9 will be available as soon as it is published.

## 7.0 RECORDS

Employee's training records will be maintained by his/her supervisor or in a central location where the records are accessible to the supervisor, employee and

authorized inspectors/personnel. Training records will be maintained for one (1) year after the employee terminates or ceases to use the training. (See NPD 1441.1, Records Retention Schedule 3; 33 [3400] N 15-38, G Technical Training). On-site contractors may utilize this record maintenance system, or they are responsible for maintaining training records for their employees.

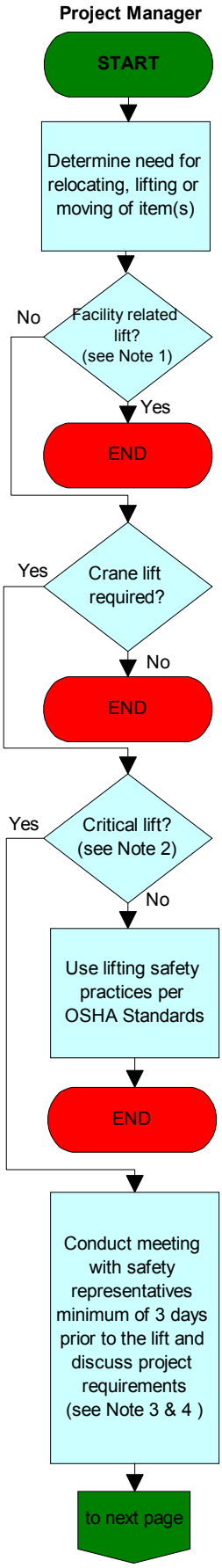
Specific critical lift procedures, submitted prior to each lift, will be kept in the Safety Office for the period of the project plus one (1) year.

## 8.0 WAIVERS

When any deviations from this process are needed, the Project Manager shall obtain a waiver from the Director of Safety and Mission Assurance.

## 9.0 FLOWCHART

See process below.




**Note 1:**

**Facility lift:**
Any facility structure, support equipment, antennas, HVAC, etc.

Facility lift will utilize DCP-F-500 and EM 385-1-1 (US Army Corps of Engineers Standard).

**Note 2:**

**Critical lift:**
-75% of cranes rated capacity
-lifting personnel

Special high dollar items as:
-space craft
-one-of-a-kind vehicle/asset whose loss would have serious programmatic impact

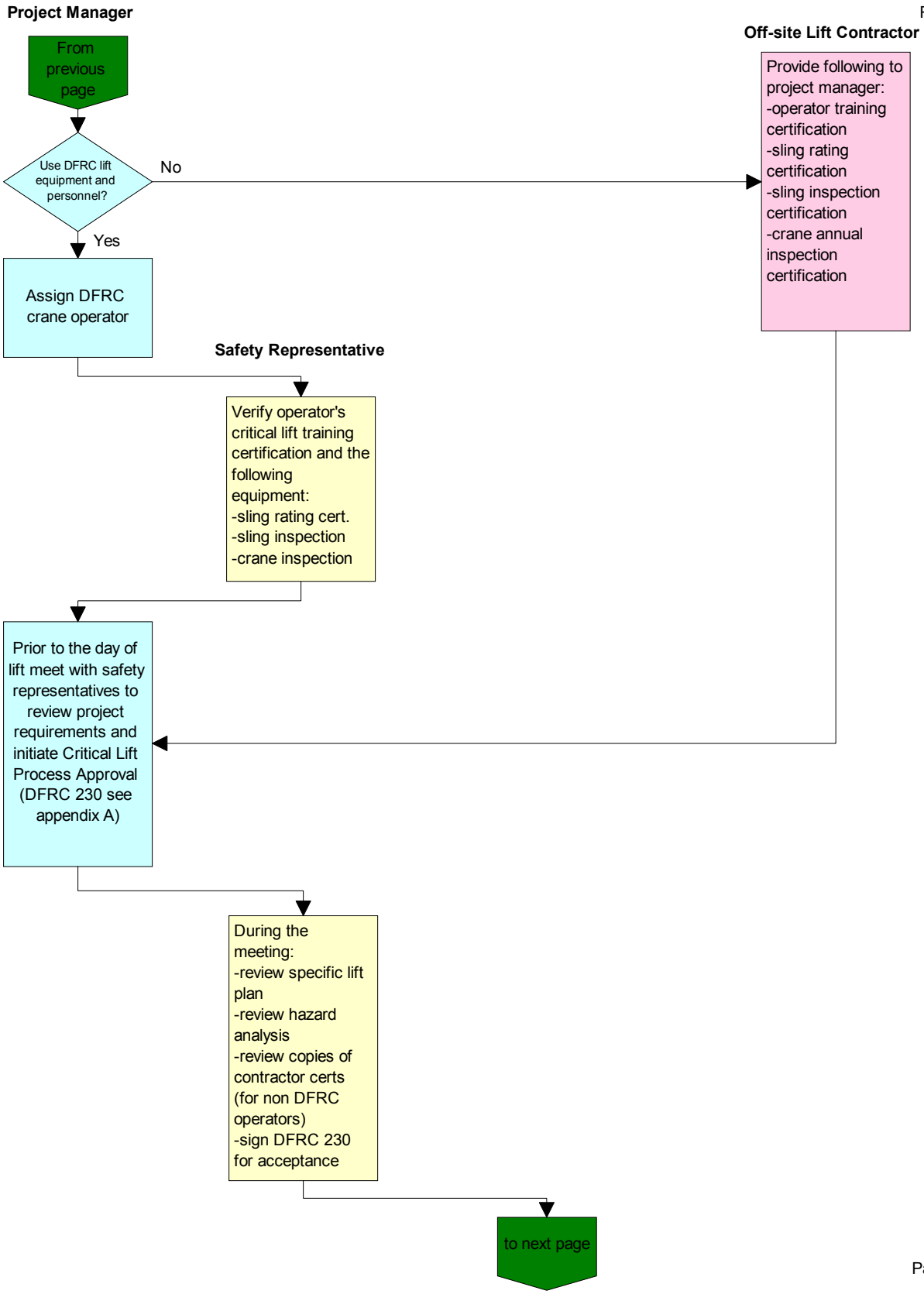
**Note 3:**

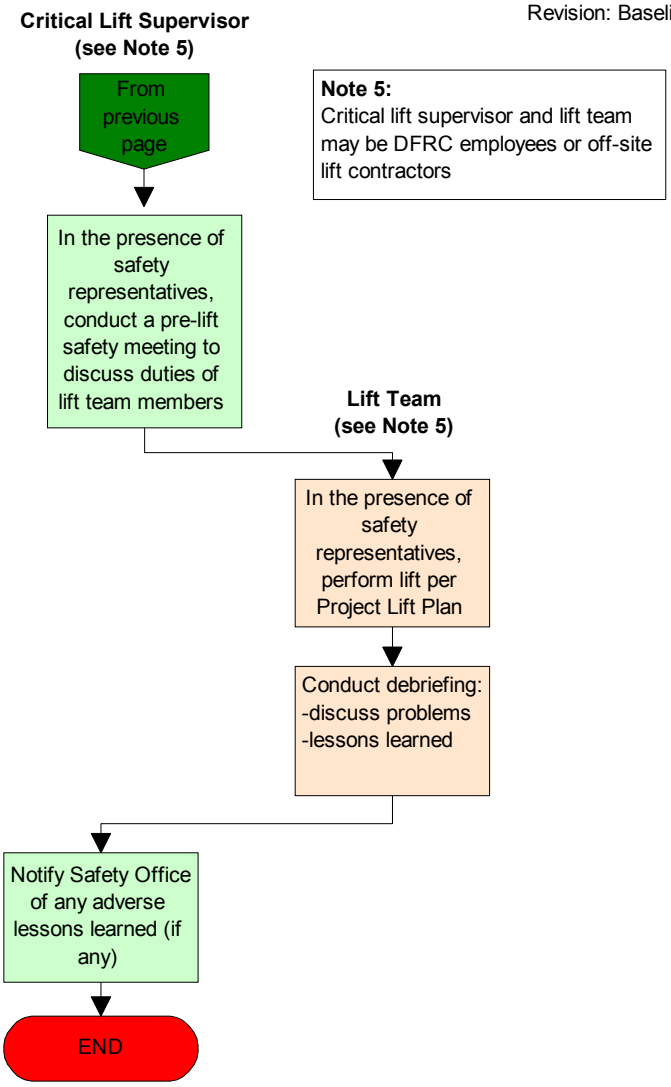
**Required personnel in the meeting:**
Project Manager/Operations Engineer

Safety representatives:
-Industrial safety
-Quality Assurance

**Note 4:**

**Project requirements:**
-use of specific lift plan is mandatory
-hazard analysis must be performed
-lift item(s) must have tag lines at opposite ends
-hard hats and steel toed boots for all personnel on lift operation
-no personnel will enter lift area to help out during lift
-no personnel under vehicle while suspended by crane





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**CRITICAL LIFT PROCESS APPROVAL**

**Project: _____Date: _____**

**Lift Activity: _____**

**Date of Activity; _____**

**Location of Activity: (Bldg. Or Site) _____**

**Plans:**

**_____1. Critical Lift Procedures (Detailed steps of operation)**

**_____2. Hazard Analysis (Associated hazards and mitigation efforts)**

**_____3. Appropriate Personnel Notified (Safety & Quality Assurance)**

**_____4. Review of Operator's Certificates (Training, crane & sling Insp.)**

**Approvals:**

**1. _____**
**Project Manager/Ops Engineer**

**2. _____**
**Safety Representative**

**3. _____**
**Quality Assurance**

**DFRC 230**
**April 1999**